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BEFORE THE
POSTAL REGULATORY COMMISSION
WASHINGTON, DC 20268-0001

Mail Processing Network
Rationalization Service Changes, 2012 Docket No. N2012-1

RESPONSES OF PUBLIC REPRESENTATIVE WITNESS RAGHAVAN (PR-T-2) TO UNITED STATES POSTAL SERVICE INTERROGATORIES (USPS/PR-T2-1 THROUGH 14)

(May 29, 2012)

Attached to this cover page are the responses of the Public Representative witness Raghavan (PR-T-2) to the Interrogatories of the United States Postal Service (USPS/PR-T2-1 through 14) filed May 14, 2012 (edited by an Erratum dated May 15, 2012). Each interrogatory is stated verbatim and followed by the response.

Respectfully Submitted,

/s/ Christopher J. Laver

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USPS/PR-T2-1. Please refer to PR-T-2 at 1.
(a) List all mail processing network analysis, design and/or optimization projects for which you have been a contributor and provide a brief description of each such project.
(b) Please list all US Postal Service facilities at which you have observed the mail processing operations described in your testimony, the approximate dates of those observations, and summarize those observations.

RESPONSE

a) The autobiographical sketch in my testimony documents my expertise in optimization efforts, such as the effort undertaken by Witness Rosenberg in this docket. Prior to this testimony I have not worked on mail processing network analysis.
b) None.

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USPS/PR-T2-2. At PR-T-2, pages 7-12, you use the scoring tool to estimate a baseline (current) number of facilities.
(a) Please confirm that you use a 4-hour cancellation window in estimating the baseline. If you do not confirm, please explain.
(b) Please confirm the current USPS cancellation window is generally 6.5 hours. If you do not confirm, please explain your understanding of the current cancellation window and the basis for that understanding.
(c) If (a) and (b) are confirmed, do you agree that the results from the scoring tool would overestimate the number of facilities required for the current network? If you do not agree, please explain.
(d) Please confirm that 1.8, 1.85, and 2.05 hours of drive time were used in the scoring tool for collection-to-cancellation (C2C) and Deliver Point Sequencing-to delivery (D2D) transportation. If you do not confirm, please explain.
(e) Is it your understanding that for each mail processing plant service area, all subordinate Post Offices are within 2.05 hours drive time of the plant? If not, what is your understanding of the extent to which the Post Office-to-plant drive time exceeds 2.05 hours?
(f) If (a) and (b) are confirmed, please state whether the results from the scoring tool using 1.8, 1.85, or 2.05 hours of drive time for C2C and D2D transportation would overestimate the number of facilities required for the current network. If you do not agree that such overestimation would occur, please explain.

RESPONSE

a) Confirmed. See line 19 of Page10 of my testimony.
b) Confirmed. See lines 15 and 16 of Page 10 of my testimony.
c) Disagree. Please see lines 1-3 on page 12 of my testimony. The cancellation windows do not affect the calculation of the number of facilities in the scoring tool. They only affect the feasibility of a mail processing network using those windows.
d) Not confirmed. As explained on lines 2 through 10 on page 11 of my testimony I incremented the drive time from 1.75 to 2.25 hours (in increments of 0.05 hours). The only feasible solutions obtained from the scoring tool were for 1.8, 1.85, and 2.05 hours.
e) The scoring tool assumes that all subordinate Post Offices are within the C2C/D2D drive time of the plant.
f) I do not understand this question. (a) and (b) are not relevant.

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USPS/PR-T2-3. At pages 12-18 of PR-T-2, you analyze the application of the LogicNet Model.
(a) Please confirm the main drivers of the resulting facility count and locations are the facility capacities and ZIP Code-to-facility distance constraints. If you do not confirm, please explain.
(b) If (a) is confirmed, please confirm the Plant-to-ZIP Code and Plant-to-Plant transportation networks are driven by the resulting facility count and locations. If you do not confirm that facility counts and locations drive Plant-to-ZIP Code and Plant-to-Plant transportation networks, please explain.

RESPONSE

a) Confirmed.
b) Not confirmed. There are no Plant-To-Plant transportation links or costs in the Logic Net Model.

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USPS/PR-T2-4. Please refer to table 2 on page 19 of PR-T-2.
(a) Please identify the process step represented by the column entitled “TIMES % (originating).”
(b) Please confirm that the percentages specified in the "ODIS % Destinating" column represent an alternative secondary calculation for cancellation percentage in a 3-digit ZIP Code.
(c) Please identify the process step represented by the column titled “ODIS % (destinating).”

RESPONSE

a) Please see Page 17, line 9 through 19 of my testimony.

b) Confirmed.

c) Please see lines 20-23 of Page 17 and lines 1-6 of Page 18 of my testimony.

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USPS/PR-T2-5. PR-T-2, page 20 at lines 7-9 states: “When traffic is extremely spiky a higher percentile value (and higher peak value) may be more appropriate.”

(a) Please confirm that your testimony suggests that addition equipment will be needed to handle peak volume. If you do not confirm, please explain.
(b) Please confirm that, as an alternative to additional equipment, an extended operating window could also be used to process peak volume. If you do not confirm, please explain.

RESPONSE:

a) Not confirmed. Line 7-9 of page 20 of my testimony suggests that if traffic is extremely spiky a higher percentile value may be more appropriate. The spikiness of the traffic needs to be evaluated in conjunction with an analysis to determine if peak volume days occur in a back to back fashion, to determine if a higher percentile value is necessary. If a higher percentile value is used, then additional equipment will be needed to handle peak volumes. Best practices would entail such an evaluation.
b) Not confirmed. It depends upon the flexibility associated with changing operating windows, and also depends upon whether peak volume days occur in a back to back fashion.

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USPS/PR-T2-6. At PR-T-2, page 28, lines 9-12, you state that you would expect Plant to-Post Office transportation cost to increase. Please provide and/or identify the data and other information that serve as the basis for this expectation.

RESPONSE:

See lines 12 to 17 on Page 26 of my testimony.

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USPS/PR-T2-7. At PR-T-2, page 30, lines 9-10, you state that it is unlikely that cancellation volume could be spread evenly over the 7 hour operating window. Please explain the basis for this conclusion. In doing so, provide specific citations to any testimony or operations data filed in this proceeding, or to any mail processing observations identified in response to USPS/PR-T2-1.

RESPONSE:

Please see page 30, lines 9-10 of my testimony, which explains that unlike DPS sortation, the cancellation workload is not available in advance. Consequently, there is no opportunity to spread the workload to smooth it out. Please see USPS-LR-N2012-1/50, Sheet 1, Row 10, for data that indicates that cancellation volume is not smooth.

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USPS/PR-T2-8. At PR-T-2, page 43, table, 8 you summarize capacity adjustments to your LogicNet Model.
(a) Please confirm that, without these adjustments, the model would be infeasible. If you do not confirm, please explain.
(b) Please confirm that you could have alternatively adjusted the Plant-to-ZIP Code distance constraints to solve the infeasibility issues. If you do not confirm, please explain.
(c) Please confirm that if distance constraints were relaxed, the model may have selected additional facilities that would have resulted in a higher facility count. If you do not confirm, please explain.

RESPONSE:

a) Confirmed.

b) Confirmed with qualifications. The result would not necessarily provide Plant-to-ZIP Code distances that are appropriate for the current service standard.

c) Not confirmed. Relaxing the distance constraints could only reduce the number of facilities.

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USPS/PR-T2-9. At PR-T-2, page 45, line 12, you define the current service standards as requiring somewhere between 239 and 277 mail processing facilities.
(a) Please confirm that a DBCS with 222 bins would not be able to sort letters to all 239 to 277 destinating facilities separately during the outgoing primary operation.
If you do not confirm, please explain.
(b) If (a) is confirmed, please state whether you agree that an outgoing secondary DBCS operation would have to be performed to finalize letters to between 239 to 277 destinations. If you do not agree, please explain.
(c) If (b) is confirmed, please state whether you agree that additional DBCS machines would need to be utilized to perform the outgoing secondary operation. If you do not agree, please explain.
(d) If (c) is confirmed, please state whether you agree that addition workroom square footage would be required to accommodate the additional DBCSs referenced in (c). If you do not agree, please explain.
(e) If (d) is confirmed, please state whether you agree that additional facilities would be required by the model. If you do not agree, please explain.

RESPONSE:

a) Not confirmed. My analysis did not include detailed equipment modeling. As stated on page 6, lines 16-21, and page 7, lines 1-2 of my testimony, the parts of witness Rosenberg's analysis (USPS-T-3 21-33), where the detailed equipment modeling is performed, are not documented to an extent that it was possible for me to replicate this analysis.
b) N/A.
c) N/A.
d) N/A.
e) N/A.

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USPS/PR-T2-10. In PR-T-2 at page 8, line 15, when discussing the USPS-T-3 scoring tool, you use the phrase "any model that is used for planning purposes . . . ."
(a) Is it your understanding that the scoring tool discussed in USPS-T-3 was designed and/or used for planning purposes? If your response is anything other than an unqualified negative, please explain.
(b) Is it your understanding that the scoring tool discussed in USPS-T-3 was designed and/or used to evaluate the feasibility of expanding operating windows? If your response is anything other than an unqualified affirmative, please explain.
(c) Is it your understanding that the scoring tool discussed in USPS-T-3 was designed and/or used to evaluate any financial savings involved with each scenario? If your response is anything other than an unqualified negative, please explain.

RESPONSE:

a) Yes, my understanding is that the scoring tool was used to evaluate operating windows. Hence it was used for planning purposes.

b) Yes.

c) No.

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USPS/PR-T2-11. On page 15 of your testimony, you suggest that the LogicNet Model in USPS-T-3 was not run through enough iterations.
(a) Is it your understanding that the USPS-T-3 model was only used to provide a starting point for network redesign? If your response is anything other than an unqualified affirmative, please explain.
(b) Is it your understanding that the final design of the December 5, 2011 network concept proposal was designed after consideration of input from postal field managers familiar with and experienced in managing facility-specific logistics and workfloor space constraints, as well as general workforce constraints? If your response is anything other than an unqualified affirmative, please explain.

RESPONSE:

a) Yes.

b) It is my understanding from pages 19-20 of witness Rosenberg's testimony (USPS-T-3) that input from Area managers was used to make changes to the ZIP Code to plant assignments provided by LogicNet. I cannot comment on how familiar they were and what specific constraints were accounted for. Other than a couple of examples on page 20 of her testimony witness Rosenberg does not elaborate much on the specifics of how and why she changed the solution provided by LogicNet to the final design of the December 5, 2011 network concept proposal. Witness Rosenberg confirms that after "ZIP code assignments that LogicNet had come up with" "were essentially modified by human discussion", they were "not then fed back into any sort of computer model to see how that would work out" (Tr.4/1481-1482). Hence, the assertion in my testimony that witness Rosenberg does not do any iterative analysis.

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USPS/PR-T2-12. On page 16 of PR-T-2, you suggest that "some of the area management expertise could have been incorporated within an optimization model" and on page 17 you suggest "incorporating peak load considerations in the Logic Net phase might have yielded a better starting point for discussion with Area management."
(a) Is it your understanding that the USPS models were designed to be optimization models? If your response is anything other than an unqualified negative, please explain.
(b) Do you agree that the proposed redesign of a mail processing network is ultimately dependent on the experience-based input of mail processing and transportation managers? If your response is anything other than an unqualified affirmative, please explain.
(c) Do you agree that the experience-based input of mail processing and transportation managers may materially alter any model outputs that form the starting point for their proposed redesign? If your response is anything other than an unqualified affirmative, please explain.

RESPONSE:

a) It is my understanding the Logic Net optimization model used by the Postal Service is an optimization model. Beyond that, I am unsure what this question is asking.
b) Disagree. If it is ultimately dependent on the experience-based input then there would be no place for the quantitative analysis in the proposed redesign.
c) Disagree. Managers may alter any model outputs if the model did not account for all of the constraints appropriately. However, if the model was designed so that it accurately and reasonably accounted for their knowledge and constraints, then it is not clear that the alteration of model outputs based on experience necessarily results in a better decision.

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USPS/PR-T2-13. On page 18 of PR-T2, you recommend averaging originating and destinating volumes. Please explain the advantages of averaging these volumes that are being moved in different directions, at different times of the day, and that are destined for different operating processes.

RESPONSE:

These volumes are used in the LogicNet model to compute demands from 3 digit ZIP Codes. Hence they affect the transportation costs and the feasibility of assignments. If a solution was computed just based on originating volumes it may not be feasible when both originating and destinating volumes are taken into account. Nor would the costs be optimal. By taking the average of these two volumes the model would get a more appropriate demand volume from each 3 digit ZIP Code (originating and destinating) and compute a better solution to the problem.

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USPS/PR-T2-14. On page 19 and 20 of PR-T-2, you recommend that 95th percentile peak factor may not be sufficient because of the possibility of back-to-back peak days.
(a) Please explain the extent to which your analysis reflects any understanding that of and takes into account whether weekends historically have provided the ability for mail processing plants to catch up when processing peak volumes?
(b) Is it your recommendation that the Postal Service should use the 99th or 98th percentile peak factor as a basis for network design?
(c) If your response to part (b) is anything other than an unqualified negative, explain why the Postal Service should install mail processing equipment that would only be used 4 to 7 days each year?

RESPONSE:

a) My analysis highlighted the fact that there is no clear justification for the use of the 95th percentile in the testimony of Postal Service witness Rosenberg. I use the term back-to-back peak days to indicate peak volume days that occur within the same week, and highlight the problems that could occur in the proposed mail network when this occurs. In this situation weekends are not available for mail processing plants to catch up (until the end of the week).
b) My recommendation is to not simply focus on a percentile value like the 95th percentile without understanding how spiky the traffic is, and if peak days occur on a back-to-back fashion. Without further analysis of postal analysis data I cannot give a specific percentile recommendation. Suffice to say from my testimony there is a problem in using the 95th percentile without a proper understanding of the traffic profile.
c) See my response to b) above. However, as Table 3 on page 20 of my testimony indicates the traffic volume is spiky. If in addition peak volume days occur in a back to back fashion then I do recommend using the 98th or 99th percentile. If not, there could be severe disruptions in the ability to move mail through the postal network (which is already being slowed down in the proposed network). It is well known in the service marketing literature that consumers are more likely to remember poor service. (For instance, Bateson (1995) and Zemke and Schaaf (1989) indicate that customers need to have as many as twelve positive experiences with a service provider in order to overcome the negative effects of

(Response to USPS/PR-T2-14 continued)

one bad experience. For additional research on service recovery, see Smith and Bolton (1998).) If in times of high volumes (when a larger number of consumers use postal facilities) postal service quality deteriorates (for example mail that currently takes 1 day, could take 3 days if there are disruptions and postal service quality deteriorates), then a larger fraction of consumers may use alternatives to the Postal Service. Ultimately it is up to postal management to make a determination whether to install additional mail processing equipment that is only used for 4-7 days a year.[1]

References:

1) Bateson, John E.G., *Managing Services Marketing: Text and Readings*, Fort Worth, TX. The Dryden Press. 1995.
2) Smith, Amy K. and Ruth N. Bolton, "An Experimental Investigation of Service Failure and Recovery: Paradox or Peril?" *Journal of Service Research*, **1** (1), 1998, 65-81.
3) Zemke, Ron and Dick Schaaf, *The Service Edge: 101 Companies That Profit from Customer Care*, New York: New American Library. 1989.

[1] According to witness Rosenberg's testimony (Page 21, Line 22) the number of days is 14-15 days a year, not 4-7 days as indicated in the interrogatory. Further, looking at aggregate numbers to compute the 95th percentile provides a view of system wide peaks. Looking at traffic at a facility (disaggregate) level, it is possible (when the behavior of traffic volumes is not similar at all plants) that some processing facilities may have a greater amount of spikiness in the traffic. This suggests at an individual facility level some facilities may have more than 14-15 days with traffic volumes above the volume planned for.